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SPEECH NOTES

for the

ACCELERATED BRUCELLOSIS ERADICATION

PROGRAM



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November 1954

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UNITED STATES DEPARTMENT OF AGRICULTURE

These notes provide background material for speeches by State or county representatives to further the brucellosis eradication program. Information is included on 10 topics from the national standpoint. State and local reports should be added at several points to make a talk applicable to the area in which it is given. Details of the history and progress of the State program are available through the State Veterinarian.

More material is included than would likely be used in any one speech, particularly since the major emphasis should be on the local program. Consequently, a speaker will want to treat some of the topics lightly, if at all, according to the interests of the group to be addressed. To aid the speaker, a summary paragraph is included at the beginning of each topic, followed by a complete discussion of the subject. The speaker may select the summary OR the complete discussion, according to his needs. Thus, from this material, he should be able to put together notes for a speech touching briefly on some points and discussing others in more detail.

SPEECH NOTES
for the
ACCELERATED BRUCELLOSIS ERADICATION
PROGRAM

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AN ACCELERATED DRIVE AGAINST BRUCELLOSIS

An accelerated drive to wipe out brucellosis in cattle is under way all across the Nation. Here in this State we're taking part, too.

The battle against this costly disease has been waged for the past twenty years. Gradually and relentlessly we have been able to gain ground and clean it out here and there. Now we have arrived at the right time to put an extra push in the drive to wipe it out in this country. The disease has been reduced to the point where the hope of eradication is more than wishful thinking.

You can never stand still in a fight against a contagious disease. If you falter, you lose ground. By moving forward now, the efforts and dollars spent will pay real dividends.

Let's take a look, first, at the enemy -- and then at how we have drawn up our battle forces against it.

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WHAT IS BRUCELLOSIS?

Summary. Brucellosis (also known as Bang's disease and contagious abortion) is the most serious and widespread of all the communicable diseases of livestock in the United States. It affects principally cattle, swine, and goats. Incidence of the disease among cattle tested in the fiscal year 1954 under the National Brucellosis Program was 2.6 percent. Man may contract the disease (also called undulant fever) by handling infected animals or their products or by consuming raw milk or milk products. Brucellosis is generally spread by infected animals -- often through infected herd replacements. The most outstanding symptom is abortion or the birth of weak or dying offspring. If abortion or premature birth occurs in a herd of cattle, hogs, or goats, a veterinarian should be called at once to test the herd.

Brucellosis (also known as Bang's disease and contagious abortion) is the most serious and widespread of all the communicable diseases of livestock in the United States. It affects principally cattle, swine, and goats, but the national eradication campaign is directed against the most costly of the 3 types -- bovine brucellosis. Man may contract it by handling infected animals or their products or by consuming raw milk or milk products.

The disease is found in all parts of the country. Incidence of infection is now 2.6 percent of the cattle tested, compared with 3.4 percent a year ago and 4.7 percent just after World War II. Incidence in _____ is _____ percent of the _____ cattle tested last year.
(State) (number)

Brucellosis is probably a disease of antiquity, since early histories described a human disease that we now know as undulant fever, or brucellosis in man. It was only toward the end of the last century, however, that the cause of the disease was discovered -- on the island of Malta, in the heart of the Mediterranean.

A major cause of disability among British forces stationed on Malta for many years had been a fever known as "Malta" or "Mediterranean" fever. In 1884, a British scientific commission, headed by Sir David Bruce, an army surgeon, was sent to the island to investigate the disease.

Three years later -- in 1887 -- Bruce succeeded in isolating a germ, which he later called "micrococcus melitensis," from the spleen blood of a living patient.

The job then was to find the source of this disease organism. Such sources of infection as insects, air, sewage, water, and dust were

gradually eliminated. In 1905, as the search continued, the scientists needed a readily available supply of experimental animals and decided to use the native milk goats. T. Zammit, a member of the Commission, tested the blood of these goats before beginning inoculations and found to his surprise that the goats' blood contained the same germ as the one Bruce had isolated from the human patient. Since goats were the main source of the island's milk supply -- which had been freely consumed by the military forces -- the source of the disease stood revealed.

In 1897, Dr. Bernard Bang, a Danish veterinarian, discovered the germ that caused contagious abortion in cattle -- known at first as "Bang's bacillus."

In 1914, Jacob Traum, a U. S. Department of Agriculture veterinarian, isolated a similar, though not identical, germ from aborting swine.

In 1917, Alice Evans, also of the Department of Agriculture, showed that all three germs were very closely related -- in size, in shape, and in effects produced in diseased animals.

These related organisms were given the family name of "Brucella" in honor of David Bruce. Although there is some cross-infection, Brucella melitensis usually infects goats -- Brucella suis, swine -- Brucella abortus, cattle. Man is susceptible to all three types of the disease.

Brucellosis is generally spread by diseased animals -- often through infected herd replacements. As the saying goes, "it is bought and paid for." The disease can be carried, however, from any point where livestock are congregated -- by shoes, clothing, contaminated vehicles.

Cattle and goats usually pick up the germs by consuming contaminated feed and water, but they may also become infected through the mucous membrane of the eye or through the skin. Hogs are most often infected through the mouth and genital tract; the boar is frequently a source of infection.

There is no sure way to tell brucellosis-infected animals by their appearance. Sometimes they may show loss of condition or swelling of the joints or the sexual organs, but these may also be symptoms of other ailments.

The most outstanding symptom is abortion -- death and expulsion of the premature fetus -- or the birth of a weak or dying offspring. Therefore, if abortion or premature birth occurs in a herd of cattle, hogs, or goats, a veterinarian should be called at once to test the herd.

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BRUCELLOSIS IS A COSTLY DISEASE

Summary. Today's cattle industry is suffering heavy losses from bovine brucellosis. According to estimates of the U. S. Department of Agriculture these losses now total more than \$58 million a year. Heaviest losses are in milk production, amounting to \$35 million. Costs of replacing dairy cows slaughtered (over money received for beef value) are estimated to be more than \$16 million; and losses in the calf crop account for nearly \$10 million.

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Today's cattle industry is suffering heavy losses from bovine brucellosis. According to estimates of the U. S. Department of Agriculture these losses now total more than \$58 million a year, based on 1953 cost and production figures.

Heaviest losses are in milk production. Brucella infection reduces milk output by about 20 percent. Something over 700,000 dairy cattle in the United States are estimated to be infected with the disease. If healthy, these cows would produce more than 3 billion pounds of milk annually. Brucellosis is cutting that production by over 800 million pounds. This represents a farm loss of \$35 million.

Another serious loss comes when dairy cows must be removed from the herd because they are affected with the disease. About 370 thousand are removed each year. It costs the grower considerably more for a new cow replacement than he gets for the beef from the infected cow. On a national scale this loss is estimated to total more than \$16 million annually.

Still another loss is in the calf crop. Surveys indicate that we are losing about 15 percent of our calves either through abortion or sterility as a result of brucellosis. Countrywide the total is some 111 thousand calves in dairy herds, more than 107 thousand beef calves. Measured in terms of potential veal production that means about 27 million pounds of veal, representing a farm loss of over \$7 million.

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PUBLIC HEALTH ASPECTS

Summary. Brucellosis is the most widespread among animals of the diseases that can be transmitted to man. It holds a special hazard for those who have direct contact with infected animals or tissues -- farmers who raise cattle and hogs, dairy-men, packing plant workers, meat handlers, and veterinarians. Use of raw milk is another way man acquires the disease and accounts for about 25 percent of the cases. Getting rid of infected animals and requiring that all milk be pasteurized is the only way to eliminate the disease in man.

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Of all the livestock diseases that can be transmitted to man, brucellosis is the most widespread among animals.

In man, the disease is also known as undulant or Malta fever. It is characterized by an intermittent fever, a shifting rheumatism of the joints, and general weakness. Of the five types of the disease recognized, one produces extremely high temperatures and may end in death. However, this type does not occur often and the death rate from the disease is low.

Human brucellosis is an occupational disease. Three out of four cases can be traced to direct contact with infected animals or tissues. This means it holds a special hazard for the farmers who raise cattle and hogs, dairymen, packing plant workers, meat handlers, and veterinarians.

Brucellosis in man may also come from the use of raw milk. Although this source of infection has decreased as pasteurization has been practiced more widely, it still accounts for about 25 percent of the cases.

There are no effective vaccines to protect human beings from exposure to brucellosis. Public health officials say the best protection is to get rid of the source of infection. If the disease is to be eliminated in man, it must first be eliminated in animals.

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THE NATIONAL BRUCELLOSIS ERADICATION PROGRAM

Summary. Extra funds authorized by the United States Congress has made possible an accelerated eradication program. Various States have stepped up their operations with the objective of becoming certified brucellosis-free. The National Brucellosis Committee is arousing further interest and support in the program. This is the time to put an extra push in the drive and wipe out brucellosis.

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In 1934 the first limited testing of cattle for brucellosis showed about 10 percent infected. The Federal-State cooperative eradication program was devised to reduce the serious losses from the disease, first as part of a cattle-reduction program, and later as a straight disease-eradication campaign. Basis of the program is testing herds for brucellosis, disposing of reactors, and vaccinating calves.

Gradual progress was made through these measures until the beginning of World War II, when many veterinarians served with the armed forces, thus reducing the personnel available to work with the eradication program. After the war, the force of disease-fighters began to build back and the level of known infection was pushed downward once more.

In 1950 the National Brucellosis Committee was formed, representing all phases of the cattle industry and other groups interested in the well-being of American agriculture, including State and Federal agencies. Through the efforts of this committee further interest and support have been aroused in the national program. Various States have stepped up their operations with the objective of becoming certified brucellosis-free.

The United States Congress last July authorized the use of extra funds for the expressed purpose of "further suppressing and eradicating brucellosis in cattle." This has made possible an accelerated eradication program. Federal funds will be used in part to restore maximum indemnities of \$25 for grade animals and \$50 for purebreds paid to owners of animals that are slaughtered as part of the eradication program. Federal indemnities are limited to no more than one-third of the difference between the animal's market value and the salvage price received. States with cooperative agreements are no longer required to match the Federal indemnity to

the owner. But the restriction is still in effect that the Federal Government shall not pay indemnities in States where cooperating livestock sanitary officials request that no such payments be made.

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LEGISLATIVE AND REGULATORY

Summary. The brucellosis program operates under basic law written into the original Act of May 29, 1884, which act directs the Secretary of Agriculture to investigate and report on the causes and treatment of animal diseases. It also empowered him to issue regulations having the effect of law to suppress and eradicate dangerous diseases. The original enactment has been supplemented from time to time with additional legislation.

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The brucellosis program, like other livestock disease eradication programs, operates under the Act of May 29, 1884, directing the Secretary of Agriculture to investigate and report on the causes and treatment of animal diseases. It also instructed him "to prepare such rules and regulations as he may deem necessary for the speedy and effectual suppression and extirpation of [dangerous contagious, infectious, and communicable] diseases, and to certify such rules and regulations to the executive authority of each State and Territory, and invite said authorities to cooperate in the execution and enforcement of this act."

This brief legal passage established the principle of Federal-State cooperation in dealing with animal diseases, and empowered the Secretary of Agriculture to issue regulations having the effect of law.

In July 1934, Congress made funds available for a cattle-reduction program as a result of the severe drought of that year. This activity

was specifically combined by Congressional action with two current disease-eradication programs -- tuberculosis and tick fever -- and brucellosis eradication was added.

Brucellosis eradication was first made a subject of separate Congressional enactment in 1944, when the Secretary of Agriculture was authorized to proceed with several emergency disease-eradication programs, "either independently or in cooperation with the States."

Naturally, the original enactment has been supplemented from time to time with additional legislation, and the operation of brucellosis and other control programs have been modified or expanded as subsequent regulations were issued by the Secretary. Laws and regulations are kept up to date by revised codes.

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FEDERAL-STATE RELATIONSHIPS

Summary. Brucellosis eradication requires the closest possible working relationship between the Federal Government and each State. To this end, a separate Memorandum of Understanding is signed by the United States Department of Agriculture with each State, outlining a program for the eradication of brucellosis, and declaring that this program shall be "cooperative in every particular."

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The Federal Government agrees (1) to assign a veterinarian in charge to work in the State, (2) to assign additional personnel when justified by circumstances and the availability of funds, (3) to pay the salaries and expenses of USDA personnel working in the State, (4) to furnish supplies and equipment, and (5) to share with the State in the payment of indemnities for animals slaughtered in the course of the program.

The State agrees (1) to assign veterinarians and other personnel to this work, (2) to furnish other supplies and equipment, (3) to encourage and promote uniform methods and rules for the establishment and maintenance of certified brucellosis-free herds, (4) to enforce State laws and regulations governing the handling and disposition of animals that react to tests for brucellosis, and (5) to authorize Federal veterinarians to participate in all phases of this work.

The contracting parties mutually agree (1) that the program shall be completely cooperative, (2) that the State veterinarian and the USDA veterinarian in charge shall frequently discuss their problems and ideas for improving their methods of operation, (3) that all information on the eradication program be made available to both parties, (4) that representatives of the State and the Department shall disseminate information on the program to livestock and milk-producing groups and to the public, and (5) that the parties will cooperate in employing veterinarians for testing and vaccination.

(Include here a statement on the role of the State Extension Service in furthering the program at both the State and county levels.)

THE PRACTICING VETERINARIAN

Summary. In brucellosis eradication, the private veterinarian does a large part of the testing, vaccinating, and marking of animals. He is paid on a per-herd and per-head basis, which permits him to do the job and still give adequate attention to his private practice.

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Ever since brucellosis eradication began, the privately practicing veterinarian has cooperated in the program. He has done a large part of the testing, vaccinating, and marking of animals in this program. Owner vaccination has never been officially recognized, because proper vaccination requires professional know-how.

In the early stages of the program, when veterinarians worked on a per diem or full-day basis, the arrangement was not uniformly satisfactory to the practitioner. He could not give attention to his private practice on days that he worked with the eradication program. A recent change in program regulations provides for veterinary fees on a per-herd and per-head basis. Even more cooperation can now be expected from practicing veterinarians without weakening the veterinary services of local communities.

A serious difficulty in the past has been a shortage of veterinarians to do the work. However, more veterinarians are graduating from the schools than during the disturbed years of World War II and the Korean War -- and fewer are required by the armed forces. Therefore, this difficulty may be gradually overcome.

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FOUR PLANS FOR THE CONTROL AND ERADICATION OF BRUCELLOSIS

Summary. There are two principal methods of combating a livestock disease: One is to wipe it out through slaughter of infected animals, and the other is to increase the resistance of animals to the infection by vaccination. Both methods are being used in the battle against brucellosis. They are used in different combinations in four eradication plans -- A, B, C, and D -- officially recognized by the United States Department of Agriculture, the United States Livestock Sanitary Association, and the National Brucellosis Committee. Plan A is the quickest method of eradication by testing the herd and removing reactors promptly. The other three plans serve to reduce infection so that Plan A is economically practical.

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In the test-and-slaughter method, herds are tested to locate reactors, or infected animals, which are immediately slaughtered. This is the quickest way to wipe out an animal disease. But brucellosis is still so widespread in many areas that full-scale operation of the test-and-slaughter method would create an economic burden. Therefore, vaccination was included in the eradication program to increase resistance of young animals to the disease until brucellosis can be more gradually reduced in areas of heavy infection.

Plan A is based on the direct test-and-slaughter method. It calls for testing the entire herd, slaughtering reactors immediately, thorough cleaning and disinfection of premises, followed by retesting at 30-day

intervals. Vaccination of calves at the age of about 6 or 8 months is optional. Calfhood vaccination is advisable if the herd is surrounded by heavily infected animals in neighboring herds. Plan A is recommended especially in lightly infected herds. All other methods serve to reduce the incidence of brucellosis to the point at which Plan A is economically practical.

Plan B calls for testing the herd, marking reactors, vaccinating calves, and retaining reactors under quarantine for a reasonably short time until they can be sold for slaughter without a heavy loss to the owner. Then, if brucellosis infection again appears, the owner will be in a position to apply Plan A.

In Plan C, calves are vaccinated but the herd is not tested. This plan is suitable for range herds, or for those in which the movement of animals is governed by special permits issued by the State livestock sanitary officials.

Plan D provides for the vaccination of nonreacting adult cattle. It is to be used only as an emergency measure with approval in writing by State and Federal officials. It has limited value and should be used only in herds where the danger of spreading the infection is very great.

These four plans are recommended for varying conditions under which the disease may be found throughout the Nation. Each has its value according to circumstances in the area and in the herd.

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TESTS FOR BRUCELLOSIS

Summary. There are two officially recognized tests for determining the presence of brucellosis: The milk ring or Brucella abortus ring test (by testing composite samples of

milk from a number of cows), makes it possible to screen whole herds and areas quickly and economically; and the blood agglutination test which is used to identify individual reactors so they can be removed.

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In fighting animal disease -- just as in any other battle -- it is necessary to know where your enemy is and how strong he is before you can successfully attack. You must first know where the disease is before you can wipe it out. In the campaign against brucellosis, we have two means of tracking down the enemy: the blood agglutination test (blood test) and the milk ring or Brucella abortus ring test (ring test). Both are officially recognized tools of the national program and both are vital to the success of any attempt to eradicate brucellosis in this country. The ring test makes it possible to screen whole herds or areas quickly and economically to determine if brucellosis is present. But the blood test is necessary to identify individual reactors so they can be removed.

The ring test was first described in Germany in 1937 and later studied and tried in Finland, Sweden, and Denmark. Most of the preliminary studies of the test in this country were made in Minnesota. The method has proved of such value in extending the areas that can be quickly tested by limited personnel that it has been adopted as an official part of the national brucellosis program.

The ring test gives best results when a composite sample of fresh, unhomogenized whole milk from 5 to 12 cows is used. Stained antigen (which is a substance used to detect the presence of disease-causing organisms) is added to a sample of milk. If Brucella antibodies are

present there will be a clumping of the antigen and the formation of a bluish-purple ring around the cream line on the surface of the milk. Hence the name "ring test." If the antibodies are not present the stained antigen remains in the milk, tinting it blue while the cream on top remains normal in color. Therefore, in order to get a true reading from the test, it is necessary to have fresh, unhomogenized whole milk or diluted cream so the action of the cream rising to the top of the specimen is normal.

Generally, the ring test is made at one point in the area, usually a creamery, where 80 to 90 percent of the milk from an area can be tested. If no evidence of infection is found by the ring test, then individual blood tests are unnecessary. This provides a great saving in cost and personnel. It has been estimated that an entire herd can be tested by the ring test for about the cost of giving one animal the blood test.

However, certain weaknesses of the ring test must be recognized and overcome to get consistently accurate results. Not all cows in a herd are in milk production at one given time. Therefore, ring tests should be made at intervals of at least every 6 months. In this way, if an infected cow should happen to be dry at the time of any one test and the herd shows negative, a later test should uncover the infection.

Furthermore, the test is based on the action of the cream. The consistency of fat globules, which make up cream, vary in different milk samples. This may cause varying reactions in individual samples and makes it impossible to rely on the ring test for accurate diagnosis of a single animal.

The blood test is based on the presence of antibodies in the blood stream of Brucella-infected animals. A blood sample is taken from an animal and brought into contact with a test fluid containing Brucella organisms. If there are agglutinins in the blood sample, the Brucella organisms in the test fluid will clump. This is a positive reaction known as agglutination. It means that the animal is or has recently been infected with brucellosis. If there is no clumping or agglutination, the animal is considered free from brucellosis.

The official blood test is made in a State or Federal laboratory and may be conducted by either of two methods: The tube method which requires 48 hours incubation; or the plate method which can be completed in about 10 minutes. Both are reliable means of identifying infected cattle.

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IT CAN BE DONE

Summary. Maine, New Hampshire, and North Carolina are now certified brucellosis-free. Minnesota and Wisconsin are making excellent progress toward certification. Nine other States -- Alabama, California, Colorado, Delaware, Illinois, Maryland, New Jersey, Ohio, and South Carolina -- have set dates for making definite advances.

* * * * *

Brucellosis can be eradicated. Three States have done it. North Carolina, New Hampshire, and Maine are now modified certified brucellosis-free, meaning that widespread testing shows less than 1 percent infection among cattle.

North Carolina was the first State to achieve the certified standard, as early as July 1942. The goal was reached through the adoption of

Plan A, concentrated test-and-slaughter program, with very little calf vaccination. The program was operated under a State law which provides that when a county signs an agreement with State and Federal authorities to carry out the brucellosis eradication program, then cooperation in that county becomes compulsory. In 1951 the State Board of Agriculture amended its regulations to make it unlawful to keep a brucellosis reactor in any herd producing milk for human consumption.

New Hampshire was certified brucellosis free August 1, 1949, the second State to achieve that status. Practicing veterinarians, paid from State or Federal funds, have done practically all the field work of the eradication project. Plan A has always been the basis of attack, with increasing numbers of calves vaccinated.

Maine was certified brucellosis-free July 1, 1950, after a concentrated test-and-slaughter program. Technicians were employed to help with drawing blood samples for the agglutination tests. Authorities in the State agree that without the use of technicians, under veterinary supervision, the goal of a certified status would have been considerably delayed. The ring test has also been used to great advantage in Maine to screen areas for evidence of infection. Veterinarians, especially practicing veterinarians, handle retesting in most infected herds. Vaccination of calves has played a minor part in Maine's eradication program.

Several other States are making excellent progress toward certification with the help of well-planned and coordinated programs. For example, Wisconsin and Minnesota are conducting highly successful programs.

The Wisconsin program is the largest ever undertaken by any State. During the past year, 6,000,000 cattle were screened by the ring test.

The sixth round of ring tests is being given to the dairy cattle in that State this year. A large share of the credit for the effectiveness of the active program is given to the cooperation of practicing veterinarians and the Wisconsin Brucellosis Advisory Committee.

In Minnesota more than 3 million cattle were screened for infection by the ring test during the past year. During the last fiscal year, records from Minnesota show 2.3 percent infection out of more than 1,300,000 cattle tested by the blood test. Thirty-three percent of the cows in the State were tested and 30 percent of the heifer calves were vaccinated. Heavy emphasis is placed on area testing, and so far all but 5 of the 87 counties in the State have signed up to cooperate in the program. Minnesota law requires ring testing in all areas of the State and compulsory blood testing in a given area when 67 percent of the livestock owners petition for the service. Regulations requiring permanent identification of reactors and restricted movement of all cattle have helped limit the spread of infection. In addition to the participation of practicing veterinarians in the program, veterinary students are widely used during the summer months to help speed up the eradication program.

An active educational program in support of the brucellosis campaign has helped to gain widespread participation in Minnesota. The Minnesota State Extension Service, in close cooperation with the Federal Veterinarian in Charge and the State Livestock Sanitary Board, is spearheading the educational drive. Releases to the press throughout the State, radio and television scripts, movies, charts, slides, and leaflets are widely used to get the story of the campaign to cattle owners in all counties.

Nine States have set dates for making definite advances:

During 1955 one goal in Alabama is the adoption of the U. S. Milk Ordinance and Code by most county and municipal health units. In Delaware, all dairy companies, except one condensary, will require milk suppliers to operate under Plan A. In Illinois all Grade A dairy herds must be under an official program by January 1, 1955. All dairy and breeding herds must be under one of the approved plans by July 1957. In Maryland all herds must be placed under Plan A and have at least one test completed by November 1, 1955. All reactors must be removed for slaughter by December 31. In South Carolina a law that becomes effective January 1, 1955, specifies that only milk from brucellosis-free herds may be offered for sale.

Beginning in 1956 California will enforce a regulation that requires evidence either of official vaccination of calves between 4 and 12 months of age, or blood tests showing the animal is brucellosis-free for all cattle moved into or within the State for any purpose except immediate slaughter. All dairy herds in Colorado must be under Plan A no later than January 1, 1956.

Ohio has set 1957 as the date when all counties will be doing area work.

The New Jersey Public Health Code has been amended to require that only milk from brucellosis-free animals may be sold within the State after April 1, 1958.

Yes, brucellosis can be wiped out. It is not an easy job. It will not be done in a week -- or a month -- or a year. It will not be done by individual farmers working alone.

The keynote of the eradication program -- the factor that can make it successful -- is cooperation. Federal and State agencies, livestock owners, and practicing veterinarians are working together to carry out the measures of the program with the wholehearted support of industry through the National Brucellosis Committee.

The attack against the disease is being made county by county, area by area, and State by State. A clean herd surrounded by infection cannot be expected to stay clean very long. That is why the best approach to the problem is on an area basis. Once the area is clean, it is easier to keep it clean. Step by step, more and more States can reach the status of "brucellosis-free." As long as each link in the chain of cooperation remains strong, we can expect that brucellosis will be eradicated in the United States.

